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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/829,153

04/22/2004

Kazutsugu Suita

04853.0113

5731

22852 7590 12/19/2008  
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EXAMINER

PECHE, JORGE O

ART UNIT

PAPER NUMBER

3664

MAIL DATE

DELIVERY MODE

12/19/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/829,153	<b>Applicant(s)</b> SUITA ET AL.	
	<b>Examiner</b> Jorge O. Peche	<b>Art Unit</b> 3664	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 October 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                      |                                                                   |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____                                                          | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

Receipt is acknowledged of Applicant's argument/remarks filed on October 10, 2008, **claims 1-6** are pending and an action on the merits is as follows.

Applicant's arguments with respect to **claims 1-6** have been fully considered but are moot in view of the same ground of rejection.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terada et al. (**Patent No.: 5,561,742**) in view of Colimitra et al. (**Patent No.: US 4,683,772**) and further in view of **Matsumoto et al. (Patent No.: US 6,459,956 B2)**.

Regarding **claims 1** and **3**, Terada discloses a multiple robot control and interference prevention method comprising the steps of:

- Defining a spatial region (virtual safety barrier) for a robot and store it in a memory, which surround the movable robot (see abstract, col. 3, line 20 – col. 4, line 57; col. 8, lines 18-35; Figure 1).

- Calculating the movement trajectory of the work or tool, determining a predicted position of each of the defined three-dimensional spatial region, matching the predicted position of each of the defined three-dimensional spatial region with the robot spatial region, and carry out a control to start the braking of the arm at a predetermined distance ahead of the robot spatial region and stop the arm (see abstract. col. 3, line 20—col. 4, line 8; col. 4, line 8 – 57; col. 5, line 13- col. 6, line 19; col. 6, lines 49-59; col. 8, lines 18-35; col. 7, line 66 – col. 8, line 35; Figure 1).

However, Terada fails to disclose a method for defining at least two three-dimensional spatial regions including parts of the arm of the robot including said work or tool, wherein each of the three-dimensional spatial regions has a substantially spherical shape with a predetermined radius, wherein the radius for each of the three-dimensional spatial regions is configured to maintain a space efficiency;

However, Colimitra teaches a hand gear train with three degree of freedom comprising the steps of:

- Defining a robot system with two movable arms, each arm having a six of degrees of freedom of movement and wherein each of the three-dimensional spatial regions has a spherical shape with a predetermined radius (see abstract, col. 1, lines 63-col. 2, lines 30, Figure 1).

Given the teaching of Colimitra, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Terada's invention to include a robot with three degree of freedom with a radius of rotation in the robot arm and base.

Doing so would enhance a multiple robot control capable to provide three degree of freedom work space.

However, Terada's invention, as modified by Colimitra, fails to disclose a physical safety barrier.

Matsumoto disclose a device a safety device for use with an industrial robot comprising the steps of constructing a physical safety barrier surrounding a movable robot surrounding a base mounted on a floor (see Figure 2).

Given the teaching of Matsumoto, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify Terada's invention to include a physical safety barrier

Doing so would enhance a multiple robot control capable to provide physical safety.

Regarding **claims 2** and **4-6** refer to **claims 1** and **3**.

### ***Response to Argument***

In the Applicant's arguments filed on October 10, 2008, with respect to the rejections of claims 1-6 under 35 U.S.C. 103(a) as being unpatentable over Terada et al. (**Patent No.: 5,561,742**) in view of Colimitra et al. (**Patent No.: US 4,683,772**) and further in view of Matsumoto et al. (**Patent No.: US 6,459,956 B2**) have been fully considered but are not persuasive.

Regarding Applicant's first argument (page 3, par. 3), "Accordingly, neither the spatial region defined by planes Pa1 and Pa2 nor the spatial region defined by the planes Pbl and Pb2 can be equated to the "virtual safety barrier surrounding the moveable robot" as claimed. Therefore, Terada does not disclose or suggest the virtual safety barrier as recited in the claims." The Examiner respectfully disagrees. A thoughtful reading of Terada in view of Colimitra and further in view of Matsumoto reveals that what is argued is clearly supported. Terada discloses a Robot A capable to move in the X-Y-Z coordinates through its base Sa, Aa1 and Aa2 arms, elbow joint Ja, which is capable to move in a sphere Cea shape (three dimensions), and wrist A, which is capable to move in a sphere Cha shape (three dimensions). The planes X-Z (Pa1 and Pa2) set the boundary for the spatial region (virtual safety barrier), which surrounds the robot A (see Abstract. col. 3, line 20—col. 4, line 8). Furthermore, Colimitra teaches a hand gear train with three degree of freedom comprising the steps of defining a robot system with two movable arms, each arm having a six of degrees of freedom of movement and wherein each of the three-dimensional spatial regions has a spherical shape with a predetermined radius (see abstract, col. 1, line 63-col. 2, line 30, Figure 1). Applicant is kindly invited to consider the references as a whole and for this argument, concentrate on Terada's abstract. col. 3, line 20—col. 4, line 8; col. 4, line 8 – 57; col. 5, line 13- col. 6, line 19; col. 6, lines 49-59; col. 8, lines 18-35; col. 7, line 66 – col. 8, line 35; Figure 1) in view of Colimitra's abstract, col. 1, line 63-col. 2, line 30; Figure 1. Furthermore, the Applicant is kindly invited to consider the above ground of rejection.

Regarding Applicant's second argument (page 3, par. 4), "Moreover, Terada discloses determining whether the spatial regions of the two robots cross, but fails to disclose or suggest "determining a predicted position of each of the defined three-dimensional spatial regions based on the trajectory calculation, and matching the predicted position of each of the defined three-dimensional spatial regions with said virtual safety barrier" as recited in the claims." The Examiner respectfully disagrees. A thought reading of Terada in view of Colimitra and further in view of Matsumoto reveals that what is argued is clearly supported. Applicant is kindly invited to consider the references as a whole and for this argument, concentrate on Terada's abstract. col. 3, line 20—col. 4, line 8; col. 4, line 8 – 57; col. 6, lines 14-19; col. 6, lines 49-59; col. 8, lines 18-35; col. 7, line 66 – col. 8, line 35; Figure 1) in view of Colimitra's abstract, col. 1, line 63-col. 2, line 30, Figure 1. Furthermore, the Applicant is kindly invited to consider the above ground of rejection.

Regarding Applicant's third argument (page 4, par. 1), "In addition, Terada does not disclose or suggest "carrying out a control to start the braking of the arm at a predetermined distance ahead of the virtual safety barrier and stop the movement of the arm ahead of the virtual safety barrier if it is determined that any one of the three-dimensional spatial regions in at least one predicted position thereof based on the trajectory calculations will come into contact with said virtual safety barrier" as recited in the claims." The Examiner respectfully disagrees. A thought reading of Terada in view of Colimitra and further in view of Matsumoto reveals that what is argued is clearly supported. Applicant is kindly invited to consider the references as a whole and for this

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argument, concentrate on Terada's abstract. col. 3, line 20—col. 4, line 8; col. 4, line 8 – 57; col. 6, lines 14-19; col. 6, lines 49-59; col. 8, lines 18-35; col. 7, line 66 – col. 8, line 35; Figure 1) in view of Colimitra's abstract, col. 1, line 63-col. 2, line 30, Figure 1.

Furthermore, the Applicant is kindly invited to consider the above ground of rejection.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jorge O. Peche whose telephone number is (571)270-1339. The examiner can normally be reached on 8:30 am - 5:30 pm Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoi H. Tran can be reached on 571-272-6919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jorge O Peche/  
Examiner, Art Unit 3664  
December 17, 2008

/KHOI TRAN/  
Supervisory Patent Examiner, Art Unit 3664